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him a *stereoscope*, which enables the observer to view the resulting appearances without altering the ordinary adaptation of the eyes, and therefore without subjecting these organs to any strain or fatigue. It consists of two plane mirrors with their backs inclined to each other at an angle of  $90^{\circ}$ , near the faces of which the two monocular pictures are so placed that their reflected images are seen by the two eyes, one placed before each mirror, in the same place; the apparatus has various adjustments by means of which the magnitude of the images on the retinae may be varied, and the optic axes differently converged. If the two monocular pictures be thus presented one to each eye, the mind will perceive, from their combined effect, a figure of three dimensions, the exact counterpart of the object from which the pictures were drawn; to show that this curious illusion does not in the least depend on shading or colouring, the illustrations principally employed are simple outline figures, which give for their perceived resultants skeleton forms of three dimensions. Each monocular outline figure is the representation of two dissimilar skeleton forms, one being the form which it is intended to represent, and another, which Prof. Wheatstone calls its converse figure. Viewed by one eye alone the outline may with equal ease be imagined to be either; but when the two monocular pictures are viewed one by each eye, the proper or the complemental form may be fixed in the mind; the former, if the right and left pictures be presented respectively to the right and left eyes; and the latter, if the right picture be presented to the left eye, and the left picture to the right eye. Many new experiments are then detailed, and a variety of instances of false perception of visual objects, some new, others formerly observed, are traced to these principles; among others, the well-known apparent conversion of cameos into intaglios. The author next proceeds to show that pictures similar in form but differing in magnitude within certain limits, when presented one to each eye, are perceived by the mind to be single and of intermediate size; and also that when totally dissimilar pictures, which cannot be combined by the mind into the resemblance of any accustomed objects, are presented one to each eye, they are in general not seen together, but alternately. The memoir concludes with a review of the various hypotheses which have been advanced to account for our seeing objects single with two eyes; and the author states his views respecting the influence which these newly developed facts are calculated to have on the decision of this much debated question.

“Experimental Researches in Electricity,” *Fourteenth Series.*

*On the general nature and relation of the Electric and Magnetic Forces.* By Michael Faraday, Esq., D.C.L., F.R.S., &c. &c.

The author commences by observing that the theory of electrical induction, which he had set forth in the 11th, 12th, and 13th series of researches, does not assume or decide anything as to the real nature of the electric forces, but only as to their distribution; the great question respecting the existence of any electric fluid, or of one, or of two fluids remaining untouched. He then states what

the theory does assume; as, for instance, that all *particles*, whether of insulators or conductors, are, as *wholes*, conductors; that, being conductors, they can readily be charged either bodily or polarly; that contiguous particles being on the line of inductive action can communicate their forces more or less readily; that those doing so most readily constitute the bodies called *conductors*, and those doing so least readily those called *insulators*, &c.

Having thus given a brief summary of the conclusions drawn from the previous investigations, the author proceeds to consider the particular condition of the particles which, in an insulating body, are considered as polarized; and after showing that the theory requires that they should be able to polarize in any direction, he states his expectation that a greater facility to polarize in one direction than another would still be found to belong to them, and proceeds experimentally to determine this point. His experiments were made by observing the degree of inductive force across cubes of perfectly crystallized bodies, as rock crystal and Iceland spar; these being cut so as to have the axis of the crystal parallel to the line joining two opposite faces of the cube; but the experiments, which are laborious, require extension, and he has not as yet been able to prove or disprove the expected result.

The author then considers whether in compound bodies it is the ultimate and elementary particles or the compound particles which polarize as wholes. He concludes that it is the latter which assume that state; and shows how this point bears upon the electrolyzation of such bodies as are separated into simpler substances, or otherwise altered by the action of the voltaic current.

He then proceeds to certain experiments bearing upon the nature of the relation of the electric and magnetic forces, giving his view of the character of this relation; and concludes his paper by briefly stating what he thinks is more satisfactorily explained by the theory which refers inductive action to an action of contiguous particles than by the old theory.

“Experiments on the Vibration of the Pendulum.” By W. J. Frodsham. Communicated by Francis Beaufort, Capt. R.N., F.R.S.

The object of this paper is to show the advantages that may result from attaching to the top of the pendulum a brass tube, which the author terms “an isochronal piece,” about five inches in length, fitting the pendulum very nicely, and slit so as to form a spring for about an inch at the bottom, sliding rather stiffly on the rod, so that its position, and consequently its influence on the action of the pendulum, may be varied at pleasure; and that unequal arcs of vibration may be made to correspond to equal intervals of time.

“An Account of some Experiments on the Blood in connexion with the Theory of Respiration.” By John Davy, M.D., F.R.S., Assistant Inspector of Army Hospitals.

The author has investigated, experimentally, several of the important questions connected with the theory of respiration and of